



Identifying Market Opportunities for Vermont Maple Syrup Producers

Prepared for the Vermont Agency of Agriculture,
Food and Markets

Abstract

This report was prepared by Atlantic Corporation for the Vermont Agency of Food, Agriculture and Markets (VAAFM) under Grant #02200-SCBGP-16-01, entitled “Identifying market opportunities for maple syrup producers in Vermont.”

The primary objectives of this project were the creation of a detailed final report and a data visualization tool to help the VAAFM, and Vermont maple syrup producers, value-added producers, and other maple syrup stakeholders identify and measure the size of market opportunities for Vermont maple syrup producers.

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About Atlantic

Atlantic Corporation is a leading agricultural business and economic research and development firm, conducting important market research for local food, agriculture, and aquaculture development, often spearheading large-scale public-private research collaborations and projects. We have completed major market assessment projects for the USDA through their SBIR, AFRI, ACER, and LFPP grant programs; NOAA; and many state governments, research institutions, and commercial enterprises. Our work has been widely published in white papers, reports, agricultural economic journals, and presented at regional and national conferences.

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Introduction

Atlantic Corporation (Atlantic) conducted primary market research for Vermont maple syrup and maple syrup products through the development and implementation of a consumer insights survey of 1,800 Northeast consumers. The primary objective of this project was to create a robust, data-driven dashboard based on the consumer preference data that will enable the Vermont Agency of Agriculture, Food and Markets (VAAFM), Vermont maple syrup producers, and other stakeholders to identify and measure the size of market opportunities for local sourced maple products. As a part of this work, we also completed business-to-business (B2B) surveys of Vermont maple syrup producers to collect baseline and projected sales data before and after implementation of our dashboard to evaluate the overall impact of the project. This report details the methodologies undertaken to develop and implement the consumer survey and B2B surveys as well as the results of each.

The following technical objectives were completed as a part of this project and are described in the subsequent sections of this report.

1. Execute pre-project interviews of Vermont maple syrup producers to determine baseline actual and projected sales revenue data.
2. Design a consumer insights survey measuring attitudes and preferences about Vermont maple syrup products to assess consumer consumption habits, willingness to pay, perceived availability of maple products, and social demographic information.
3. Implement consumer survey following a pre-designed and proven project lifecycle targeting 200 respondents from nine different states for a total minimum sample size of 1,800.
4. Conduct descriptive and inferential data analysis, including economic analysis and modeling to identify and quantify the potential value of market opportunities by product and state based on the consumer survey data and state population and demographic statistics.
5. Design and develop an extensive data dashboard containing all survey data enabling users to conduct deep dives into the consumer preference data collected as a part of this project.
6. Conduct outreach and extension efforts to communicate survey results, market analysis and findings, and the availability of the project tools (this data report and the data dashboard) to maple syrup producers associated with the Vermont Maple Sugar Makers Association (VMSMA).
7. Execute post-project follow-up interviews with Vermont maple syrup producers who participated in the pre-project survey and used the data report and dashboard to determine project impact.

Executive Summary

Atlantic Corporation (Atlantic) completed comprehensive primary market research for the Vermont Agency of Agriculture, Food and Markets (VAAFM) to determine consumer preferences for maple syrup and identify and evaluate market opportunities for Vermont maple syrup producers among Northeast consumers. Our research consisted of the following components: a consumer insights survey of 1,802 respondents; development of an interactive dashboard using the consumer preference data; and implementation of business-to-business (B2B) surveys of 73 Vermont producers both pre- and post-project to assess the impact of our research. Key findings of all deliverables are highlighted in this summary.

Consumer Preference Survey

The consumer preference survey was designed by both Atlantic and the VAAFM and implemented with assistance from Dynata, a leading market research firm. Based on statistical evidence, this study develops a better understanding of consumer attitudes and preferences for maple syrup and aims to identify and quantify local market opportunities for Vermont producers and other maple syrup stakeholders. A total of 1,802 respondents completed the survey, with key findings as follows:

- Consumers in Vermont and its neighboring states of Massachusetts and New Hampshire have a higher awareness of Vermont maple brands and stores selling their brands than consumers in other Northeastern states. Consumers from Pennsylvania were least aware of Vermont maple brands.
- Consumers generally have consistent perceptions of the industry's impact and view its impact on the local agricultural economy as critical.
- Almost 80% of consumers surveyed purchased and consumed maple syrup and products in the last 12 months. Respondents also consumed alternatives to maple syrup, including honey, imitation maple table syrups, molasses, high fructose corn syrup, and fruit-based table syrup, but rates of maple syrup consumption were higher than the alternatives.
- There was no clear preference for maple syrup flavor profile. On a scale of 1 to 7, with 7 being "Extremely Like," all four grades scored between 4.5 and 5.2 on average, with Amber Color/Rich Taste scoring highest and Golden Color/Delicate Taste scoring lowest.
- Cost was determined to be the biggest factor among those who reported not consuming maple syrup products, followed by availability, diet, and taste.
- About 90% of consumers spend between \$5 and \$250 per year on maple products, in which the largest subgroup (about 50% of consumers) spend between \$20 and \$90. Nearly half of consumers make their purchases in supermarkets, which is evidently the main retail channel of the products.
- Consumer purchase behavior also shows a clear seasonal pattern: most purchases are in the fall season, followed by winter and spring seasons, and fewest number of purchases are made in the summer season, which is only half of the amount in the fall season.

- Maple syrup is the overwhelmingly most available maple product to consumers in their local markets (95% availability). Accordingly, consumers spent about \$40 of their annual maple budget on maple syrup in the past 12 months, a substantial portion of their annual maple budget. Other widely available products include baked maple goods (78% availability), maple sauces/dressing/spices (72%), maple dairy products (69%), and maple meats (67%).
- The most popular use of maple syrup is topping for pancakes, waffles, oatmeal, etc. The amber color and rich taste maple syrup is ranked the most preferred flavor profile, followed by the dark color and robust taste syrup, very dark color and strong taste syrup, and golden color and delicate taste syrup. The clear glass container in Quart or Pint size is the most preferred packaging.
- Consumers preferred either quart- or pint-size packaging and clear glass containers along with clear or tan plastic containers.
- The data show clear impacts of maple products' geographic origin on consumers' preferences, suggesting its important role in affecting purchasing decisions. In this regard, consumers most frequently rate maple products from New England region, especially Vermont, of higher quality than those from other areas.
- The distribution of the percentage of consumer maple budget spent on Vermont maple products is significantly positively skewed, with its mean much larger than its median. This suggests an unbalanced budget for Vermont maple products between a small group of "loyal consumers" and the other consumers.
- On average, consumers stated they are willing to pay a 26% premium for Vermont maple syrup, ranking the highest among all maple products assessed. The distribution of willingness to pay premiums is also positively skewed.
- Economic modeling was conducted to identify key factors influencing actual spending on Vermont maple products over the last 12 months and consumers' willingness to pay premiums for Vermont maple syrup. The first model demonstrated state, age, gender, education, income, the experience of visiting Vermont, and importance placed on product origin are statistically significant factors influencing spending on the Vermont maple products.
- The second model showed only gender plays a statistically significant role in influencing the WTP premiums. Specifically, male consumers are willing to pay a higher premium than female consumers. The modeling results imply that the decisions on WTP premiums and on actual spending are inconsistent and affected by different factors.

B2B Surveys

Atlantic implemented a pre-project B2B questionnaire to a group of 73 Vermont maple producers to collect baseline information on the state of the industry, current/projected revenues of maple operations, and general feelings of business satisfaction and performance. This information guided the creation of a follow-up survey used to gauge the industry impact of Atlantic's maple

product data dashboard. A total of 37 respondents of the pre-project surveys who had used the data dashboard completed the post-project follow-up survey.

Findings from the pre-project survey (73 respondents) are as follows:

- In 2020, the average farm produced 3,342 gallons of maple syrup. The breakdown of their product sales was as follows: maple syrup (90.93%), candies (0.72%), cream (1.54%), butter (0.01%), other (6.79%). Other maple products include jams and sauces, nuts, sugar, and baked products.
- The average revenue for maple operations in 2019 was \$86,874. The highest revenue earned by a single operation was \$1,320,000. High earners skewed the mean as median revenue was \$27,700.
- Projected revenue for 2020 was \$88,712, an increase of 2.1% over 2019's revenue. The largest operation projected \$1,180,000 in sales. Respondents were also asked by what percentage they believe COVID impacted their sales. On average, respondents estimated an 8.2% decrease in sales due to COVID with some producers reporting estimated decreases as high as 50%.
- The average projected revenue for maple operations in 2021 was \$103,190, an increase of 16.3% over 2020's projected revenue. The largest operation projected \$1,300,000 in sales.
- Respondents stated using innovations such as reverse osmosis, monitor systems in the woods, vacuum pumps, steam pans, and a piggyback system to improve output. To expand their offerings, producers are getting organic certification, creating bird-friendly maple products, and utilizing self-serve kiosks to sell products.
- Respondents were mostly satisfied with the current performance of their operations. On a scale of 1-7, with 1 being "Extremely Dissatisfied" and 7 being "Extremely Satisfied", producers rated the current performance of their business an average of 5.1.

Findings from the post-project follow-up survey (37 respondents) are as follows:

- Respondents had mostly positive overall impressions of the dashboard. On a ten-point scale, with 1 being "Poor" and 10 being "Excellent", respondents rated the maple dashboard a 7.7.
- Respondents viewed the dashboard as valuable in terms of planning for maple processing and production. On a ten-point scale, with 1 being, "Not at All Valuable" and 10 being "Very Valuable", respondents rated the maple dashboard an average of 6.5 with regards to planning for processing/production.
- Respondents were somewhat likely to use the dashboard to assist with business or operational planning. On a ten-point scale, with 1 being "Very Unlikely" and 10 being "Very Likely", respondents rated the maple dashboard an average of 5.92 with regards to the likelihood they would use the dashboard for business planning.

- The dashboard scored highly in terms of ease of use, content, presentation, usefulness, and accuracy. Respondents noted the dashboard had good marketing data and were impressed with data regarding packaging sizes and materials.
- Over 40% of respondents indicated that they believe they can grow their sales by applying information from the dashboard. Of these respondents, the average projected improvement in revenue resulting from the dashboard was estimated to be 11.7%, with a range of 1% to 50%.

1. Consumer Preference Survey

The consumer insights survey was designed by Atlantic and the VAAFM and implemented by Dynata, a global online marketing research firm, during December 2020 and January 2021. The goal of the survey was to better understand consumer attitudes and preferences about maple syrup products. The survey included questions regarding the following:

- Socio-demographic information
- Knowledge of maple operations and Vermont maple brands
- Perceptions of the maple industry
- Purchase and consumption experience of maple syrup and products
- Maple syrup and maple product shopping habits
- Preferences for maple syrup
- Impact of geographical origin on purchasing decisions

There were 1802 responses among Northeast consumers from these states: Connecticut, Maine, Massachusetts, New Hampshire, New York, New Jersey, Pennsylvania, Rhode Island, and Vermont. After removing 44 observations with missing age or gender, 1758 observations remain.

Table 1 presents the summary statistics of socio-demographic variables. The table includes three panels: statistics of all the observations included in the analysis (n=1758); statistics of those who purchased or consumed maple syrup and/or other maple products in the past 12 months (n=1396); and statistics of consumers who have not purchased or consumed maple syrup and/or other maple products in the past 12 months (n=362). The consumers who have purchased or consumed maple products in the past 12 months answered all the survey questions, while the consumers who did not only answered questions about socio-demographic information, knowledge of maple operations and brands, and perceptions of the maple industry.

Since the responses to most survey questions are from the consumers who have purchased or consumed maple syrup and/or other products in the past 12 months, we focus on the middle panel to explain the statistics of socio-demographic variables. The observations are relatively evenly distributed across the nine states. The average age of consumers was about 44 years old; 43.6% were male, 56.2% were female, and 0.3% were non-binary. About 19% completed high school, 34% completed some college, 29% completed a bachelor's degree, and 18% completed a graduate or professional degree.

About 18% of less than \$24.99k, 22% had incomes of \$25k-49.99k, 35% had incomes of 50k-99.99k, 15% had 100k-149.99k, and 9% had over \$150k. About 80% of consumers were the primary food shopper in the household and about 20% shared food shopping with other household members. On average, each household had 2.7 people. About 37% of households had children in the household. About 66% of consumers had visited Vermont and 33% had not.

The average monthly food expenditure from all retail channels (stores, delivery services, restaurants) were \$724, \$107, and \$229, respectively. Note that the survey allows a maximum answer of \$5,000 for these three categories. Many consumers answered \$5,000 or closer to that amount in each category, which may cause an overestimate of the monthly expenditures. The standard deviations of these three expenditures are high as a result.

Table 1. Summary Statistics of Socio-demographic Variables

Variable	All Observations (n=1758)		Have purchased or consumed maple syrup and/or other maple products in the past 12 months (n=1396)		Have not purchased or consumed maple syrup and/or other maple products in the past 12 months (n=362)	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
State						
CT	11.21% (n=197)	0.3155	10.89% (n=152)	0.3116	12.43% (n=45)	0.3304
MA	10.92% (n=192)	0.3120	10.74% (n=150)	0.3098	11.60% (n=42)	0.3207
ME	11.15% (n=196)	0.3148	11.68% (n=163)	0.3213	9.12% (n=33)	0.2882
NH	11.26% (n=198)	0.3162	12.32% (n=172)	0.3288	7.18% (n=26)	0.2586
NJ	10.92% (n=192)	0.3120	9.96% (n=139)	0.2995	14.64% (n=53)	0.3540
NY	11.15% (n=196)	0.3148	9.89% (n=138)	0.2986	16.02% (n=58)	0.3673
PA	11.04% (n=194)	0.3134	10.32% (n=144)	0.3043	13.81% (n=50)	0.3455
RI	11.09% (n=195)	0.3141	11.60% (n=162)	0.3204	9.12% (n=33)	0.2882
VT	11.26% (n=198)	0.3162	12.61% (n=176)	0.3321	6.08% (n=22)	0.2392
Age	45.70	16.6715	44.22	15.8068	51.40	18.6041
Gender						
Male	44.31%	0.4969	43.55%	0.4960	47.24%	0.4999
Female	55.40%	0.4972	56.16%	0.4964	52.49%	0.5001
Other	0.28%	0.0533	0.29%	0.0535	0.28%	0.0526
Education						
Up to High School or GED	21.44%	0.4106	18.91%	0.3917	31.22%	0.4640
Some college, no degree	20.71%	0.4053	21.35%	0.4099	18.23%	0.3866
Associate degree	12.68%	0.3329	13.25%	0.3392	10.50%	0.3069
Bachelor's degree	28.16%	0.4499	28.80%	0.4530	25.69%	0.4375
Graduate or professional degree	17.01%	0.3758	17.69%	0.3817	14.36%	0.3512
Annual household income						
Less than \$15k	10.86%	0.3113	8.88%	0.2846	18.51%	0.3889
\$15k-\$24.99K	9.61%	0.2949	9.31%	0.2907	10.77%	0.3105

\$25k-\$34.99k	10.18%	0.3025	10.39%	0.3052	9.39%	0.2921
\$35k-49.99k	12.46%	0.3303	12.32%	0.3288	12.98%	0.3366
\$50-74.99k	18.94%	0.3920	18.77%	0.3906	19.61%	0.3976
\$75k-99.99k	15.30%	0.3601	15.97%	0.3665	12.71%	0.3335
\$100k-149.99k	14.11%	0.3482	15.11%	0.3583	10.22%	0.3033
\$150k-199.99k	4.89%	0.2158	5.23%	0.2227	3.59%	0.1863
over \$200k	3.64%	0.1873	4.01%	0.1963	2.21%	0.1472
Household food shopper						
Primary food shopper	79.86%	0.4011	80.09%	0.3995	79.01%	0.4078
Shared food shopper	20.14%	0.4011	19.91%	0.3995	20.99%	0.4078
Household size	2.5597	1.4392	2.6755	1.4353	2.1133	1.3668
If there are children in the household	33.16%	0.4709	36.96%	0.4829	18.51%	0.3889
Average monthly food expenditure:						
Food stores	705.36	1082.1900	723.72	1073.2600	634.56	1114.6300
Mail order and other home delivery services	108.51	433.3537	107.20	397.5677	113.55	550.6262
Restaurants and prepared takeout	216.89	539.8402	229.03	557.0656	170.10	465.2488
If have visited Vermont						
Yes	60.86%	0.4882	66.40%	0.4725	39.50%	0.4895
No	38.17%	0.4859	32.74%	0.4694	59.12%	0.4923
Not sure	0.97%	0.0979	0.86%	0.0923	1.38%	0.1169

Consumer Knowledge of Vermont Maple Brands

Consumer knowledge of Vermont maple brands was collected from all the 1,758 respondents. Figure 1 shows consumers' awareness of Vermont maple brands by state. About 87.4% of Vermont consumers were aware of one or more Vermont maple brands, followed by New Hampshire consumers at 60.1%, Massachusetts at 57.3%, New Jersey at 48.4%, Rhode Island at 47.7%, Maine at 45.4%, Connecticut at 41.6%, New York at 36.2%, and Pennsylvania at 30.4%. This indicates that the Vermont maple brands have high awareness inside the state and in the neighboring states New Hampshire and Massachusetts.

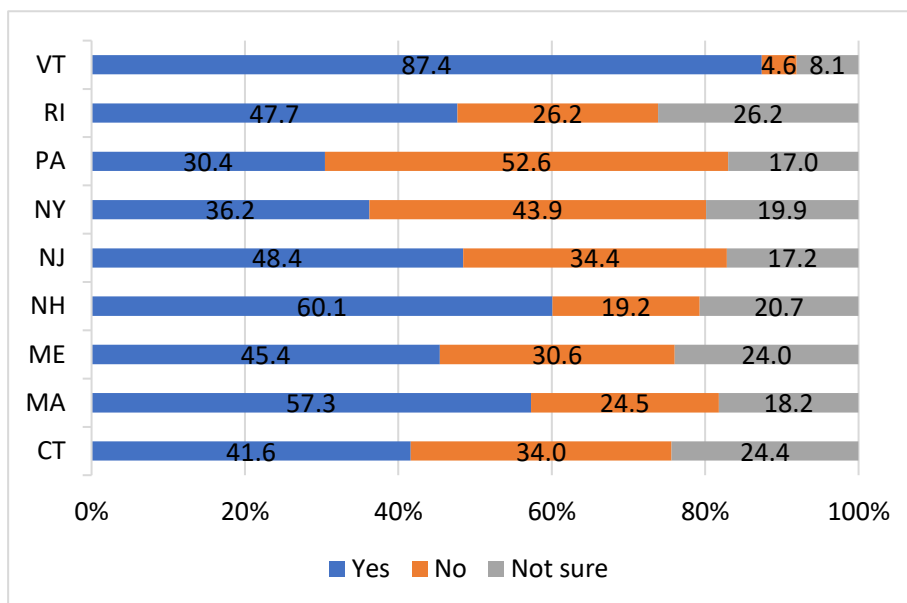


Figure 1. Consumers' Awareness of Vermont Maple Brands by State

Vermont consumers are well aware of Vermont maple syrup brands.

Awareness levels decrease in markets farther away from Vermont.

Figure 2 shows consumer awareness of Vermont maple brands selling maple syrup or maple products in their local stores. About 88.9% of Vermont consumers were aware of Vermont maple brands selling at their local stores, followed by New Hampshire consumers at 62.1%, Massachusetts at 56.8%, Rhode Island at 49.7%, Connecticut at 49.2%, Maine at 46.9%, New Jersey at 46.4%, New York at 42.4%, and Pennsylvania at 26.3%.

Again, this shows the Vermont consumers are well aware of Vermont maple brands selling at local stores. The awareness levels decrease when the markets are farther away from Vermont. Especially, only about 26.3% of consumers in Pennsylvania are aware of Vermont maple brands selling at local stores, while about 53.6% of consumers in the state are not aware of the availability of Vermont maple brands in their local stores.

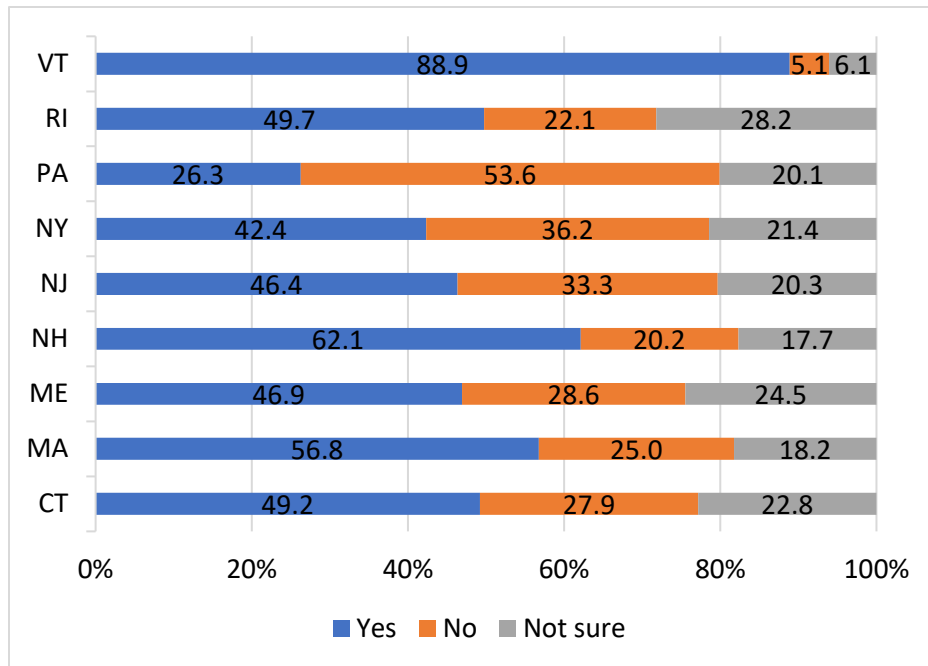


Figure 2. Consumer Awareness of Vermont Maple Brands Selling Maple Syrup or Maple Products in Their Local Stores

Figure 3 shows customers' rating of their current knowledge of maple processing at various levels. About 18.8% of consumers had no knowledge of maple processing, while about 13% of consumers were extremely or close to extremely knowledgeable about maple processing. The rest of consumers indicated some degree of knowledge of maple processing.

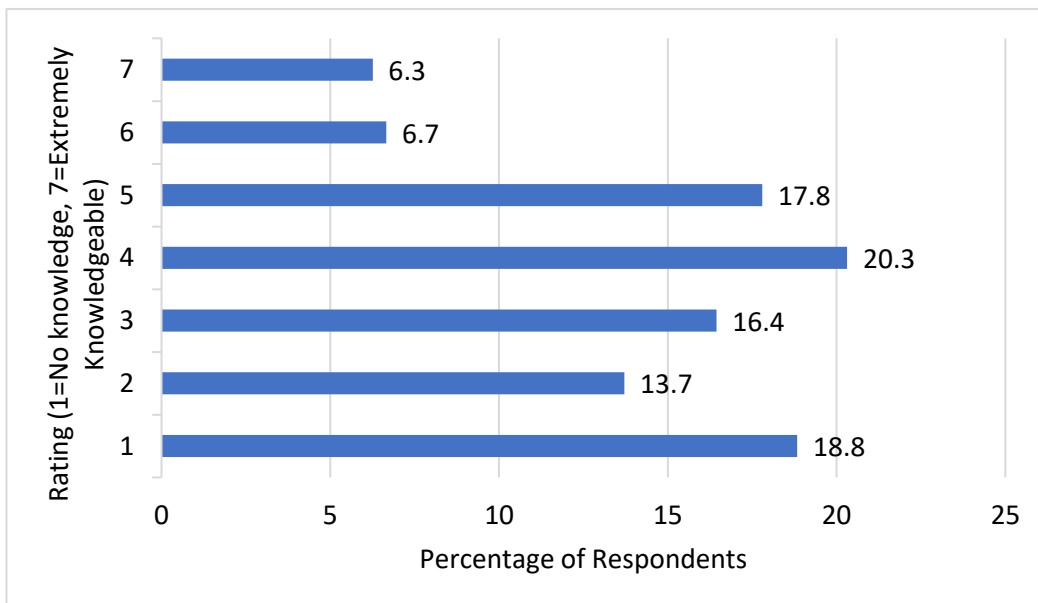


Figure 3. Consumer Knowledge of Maple Processing

Figure 4 shows consumers' average rating of their current knowledge of maple processing by state. Vermont consumers show the highest knowledge level, at an average rating of 4.68, followed by Maine consumers at 3.96 and New Hampshire consumers at 3.91.

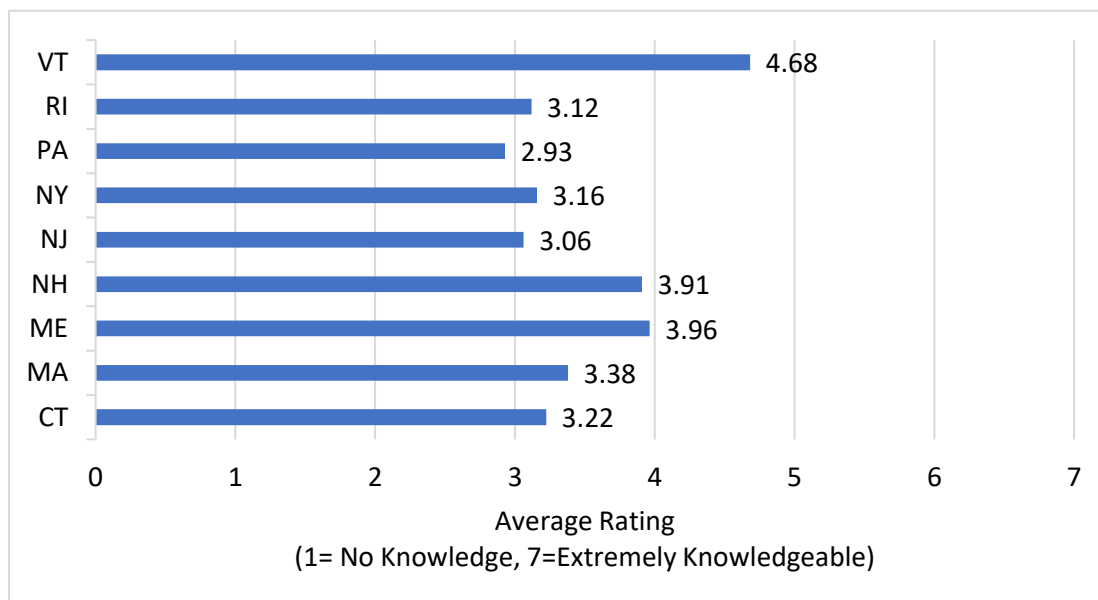


Figure 4. Consumer Knowledge of Maple Processing by State

Consumers' Perceptions of the Maple Industry

Table 2 shows consumers' rating of the maple industry's impact over the past 12 months on various economic and societal factors on a 7-point Likert scale. The average ratings indicate that consumers' perceptions of the maple industry's impact on the various perspectives were similar, with the average rating ranging from 4.2 to 5.1. Notably, the ratings on rural farming communities and local economy topics were the highest, indicating that consumers believe the maple industry has an important impact on the local agricultural economy. It is worth noting that a significant number of consumers responded that they were not sure about the answer to these topics. Notably, 664 out of the 1758 consumers are not sure about the maple industry's impact on U.S. international trade deficit.

Table 2. Consumer Rating of the Maple Industry’s Impact on Various Factors Over the Past 12 Months (1=Extremely Negative; 7=Extremely Positive)

Topic	Answered			Not Sure about the Answer
	No. of Obs.	Mean	Std Dev	No. of Obs.
U.S. Economy	1,256	4.74	1.75	502
U.S. International Trade Deficit	1,094	4.19	1.66	664
Local Economies	1,329	4.98	1.73	429
Rural Farming Communities	1,351	5.09	1.72	407
Job Creation	1,232	4.49	1.68	526
Environment	1,248	4.75	1.66	510
U.S. Food Security	1,220	4.63	1.69	538
Nutrition for U.S. consumers	1,250	4.65	1.69	508
Keeping Prices Low	1,247	4.52	1.66	511
Climate Change	1,170	4.38	1.76	588

Purchase/Consumption Experience of Maple Syrup and Products

Figure 5 shows consumers’ purchase/consumption experience of maple syrup and products in the past 12 months. Out of the 1,758 consumers, 1,396 (79%) have purchased or consumed maple syrup and/or other maple products in the past 12 months, while 362 or (21%) have not.

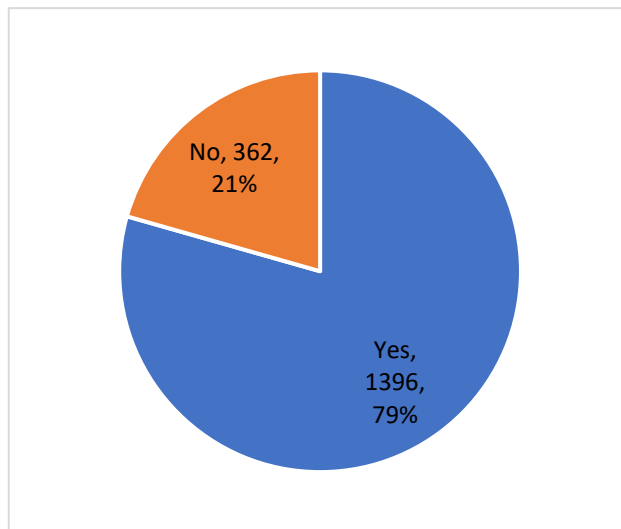


Figure 5. Consumption of Maple Syrup and/or Maple Syrup Products

Figure 6 shows consumers' consumption experience of products similar to maple syrup in the past 12 months. About 70.4% of consumers have consumed honey, a standard product in typical households. About 37.8%, 25.9%, and 18.7% of consumers have consumed imitation maple table syrups, molasses, and fruit-based table syrups, respectively. Comparing the 79% purchase/consumption experience percentage in Figure 5 and the portions of consumers who consumed alternative syrups in Figure 6, it shows that maple syrup has higher popularity than the other alternatives.

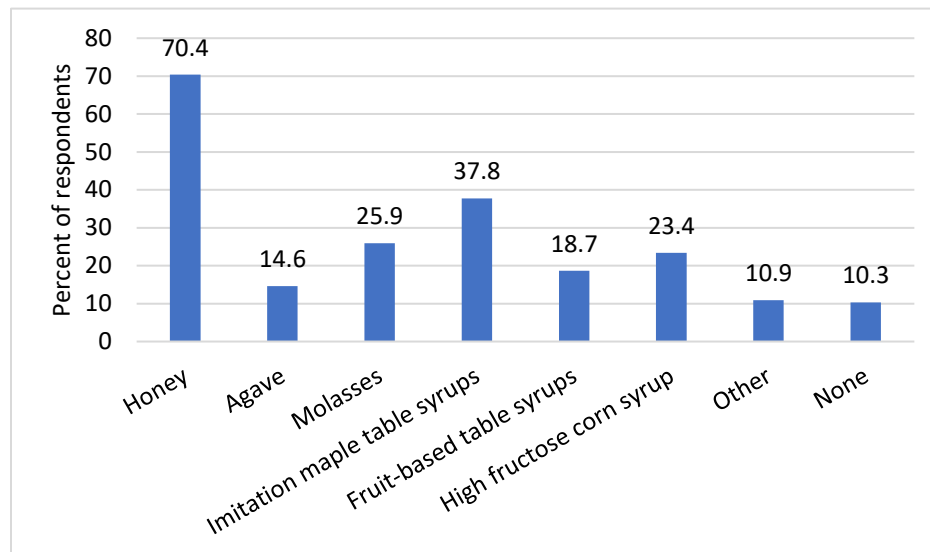


Figure 6. Consumption of Maple Syrup Alternatives in Past 12 months

Figure 7 displays reasons why the 362 (21%) consumers have not consumed maple products in the past 12 months. The "Other" category accounts for 36.5%, indicating there are likely other important reasons outside the range of the ones listed in the survey question. Also, cost, taste, diet, and availability are comparable reasons consumers have not consumed maple products.

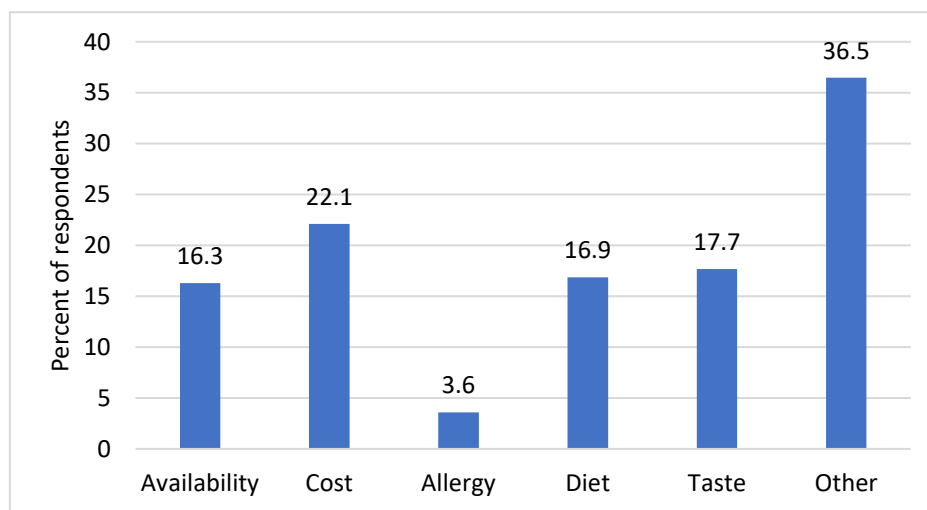


Figure 7. Reasons for not consuming maple syrup

Consumers' Shopping Habits of Maple Products

This section assesses the shopping habits, preferences, and attitudes among the group of 1,396 consumers who purchased or consumed maple syrup and/or other maple products in the past 12 months. In this section, all analyses are based on the group of 1,396 consumers.

Shopping Expenses

Table 3 shows a summary statistics of consumers' current annual expenses on all maple products. On average, each consumer spent about \$86 per year on maple products, with a standard deviation of \$242. About 90% of consumers spent between \$5 and \$250 per year, and about 50% of consumers spent between \$20 and \$90 per year. In the survey design, the largest possible annual expense was set at \$4,000. A few consumers spent substantially more than others, up to \$4,000 per year, on maple products.

Table 3. Consumers' current annual expenses on all maple products

Mean	Std Dev	Min	5th percentile	25th percentile	Median	75th percentile	95th percentile	Max
86.27	241.83	0	5	20	40	90	250	4000

Shopping Location

Figure 8 shows the portion of consumers' annual maple budget spent on various stores in the last 12 months. Consumers spent about half of their annual maple budget (47.8%) at supermarkets, indicating supermarkets are the most popular location for consumers to purchase maple products. The big box stores, direct sale from a producer, and local farmer's market are also popular shopping locations and consumers spent about 10% of their budget at each.

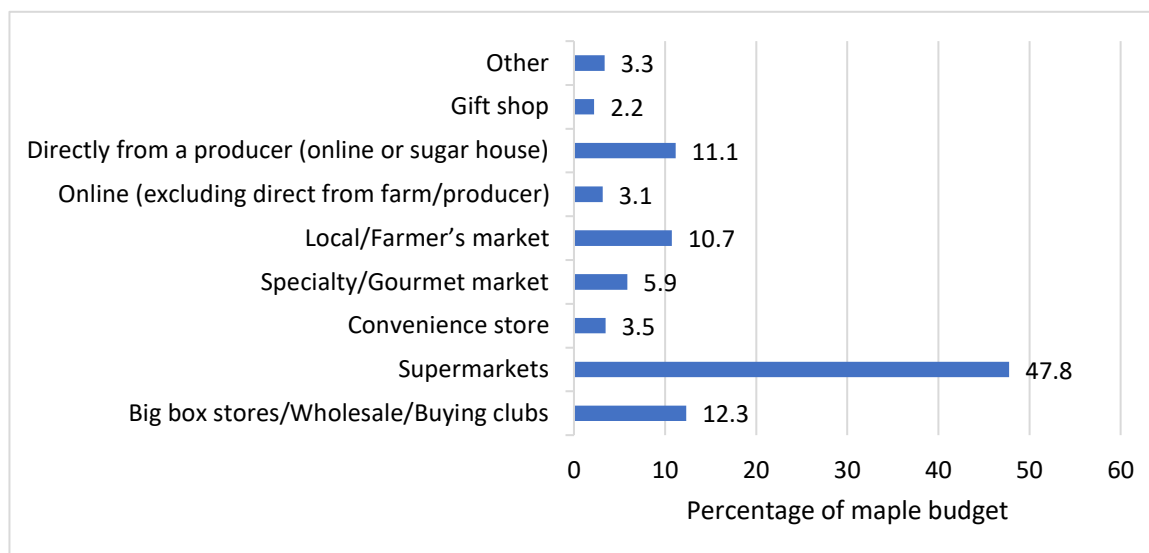


Figure 8. Maple Syrup Purchase Locations as Portion of Annual Maple Budget

Shopping Seasonality

Figure 9 shows the distribution of consumers' maple purchase in each season. Over the past 12 months, consumers conducted most of their maple syrup purchases in the fall (33.3%) followed by the winter (26.1%). Consumers made fewest maple syrup purchases in the summer (17.4%). These results demonstrate clear seasonality in consumers' purchasing behavior, with fall being the most popular season and summer the least popular to purchase maple products.

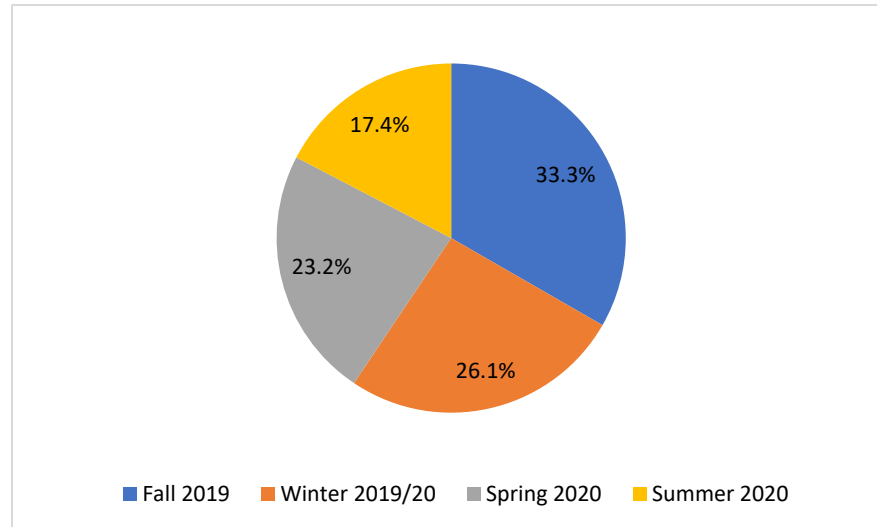


Figure 9. Maple Syrup Purchase Seasonality

Types of Products

Figure 10 shows the availability of various maple products to consumers at locations they usually shop. About 95% of consumers indicated maple syrup is available where they typically shop, showing that maple syrup is the most readily available maple product. Similarly, the availability of other products was ranked by consumers in the order of baked maple goods (78% availability), maple sauces/dressing/spices (72%), maple dairy products (69%), maple meats (67%), maple candy products (54%), maple sugar (48%), maple cream or butter (35%), maple-infused alcoholic beverages (25%), maple-flavored non-alcoholic beverages (21%), and maple water (16%). Although some consumers confirmed the availability of maple beverages in their usual shopping venues, they are not readily available on a large scale.

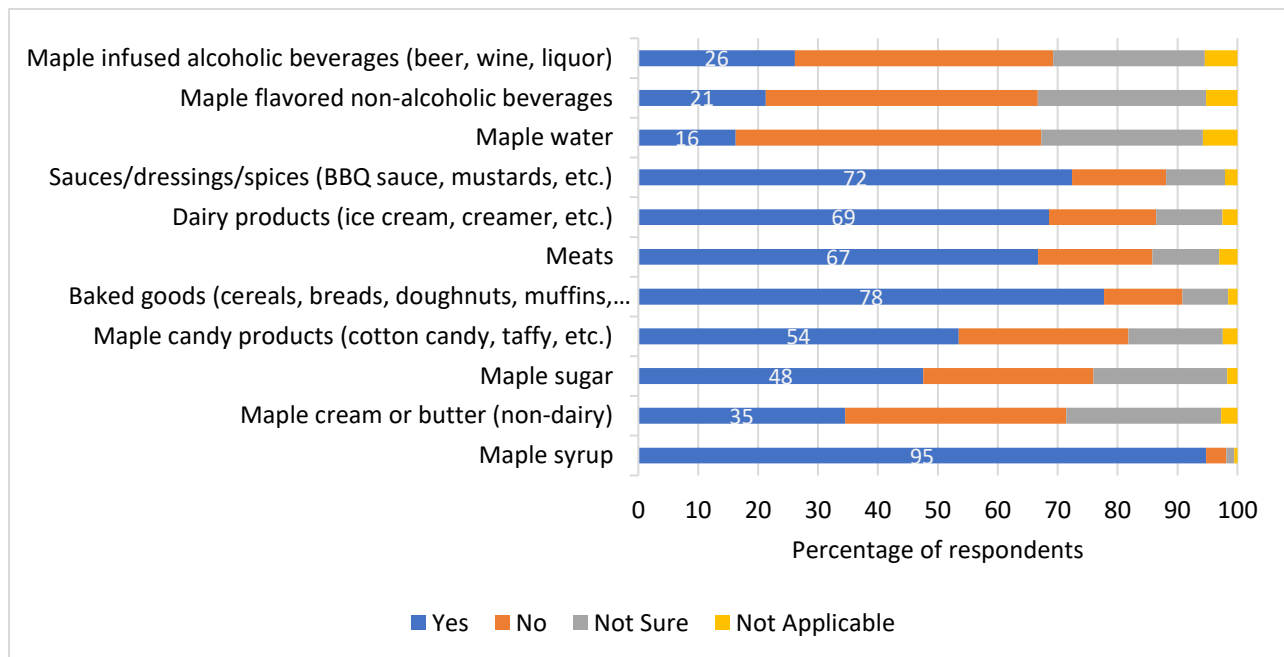


Figure 10. Perceived Availability of Maple Products at Consumers' Usual Retail Locations

Following the maple product categories in Figure 10, Figure 11 shows consumers' annual expenses on these products. Consumers spent an average of about \$40 of their annual maple budget on maple syrup last year. They also spent on other categories, for example, about \$8.2 on baked maple goods and \$7 on maple meats, but the magnitude is not comparable to the expenses on maple syrup.

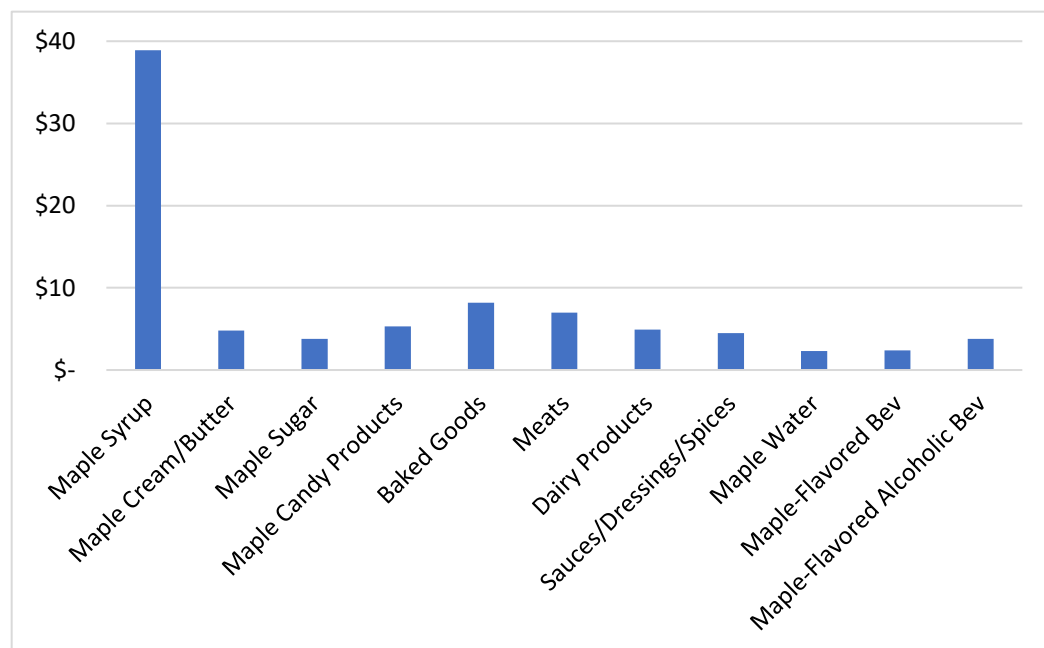
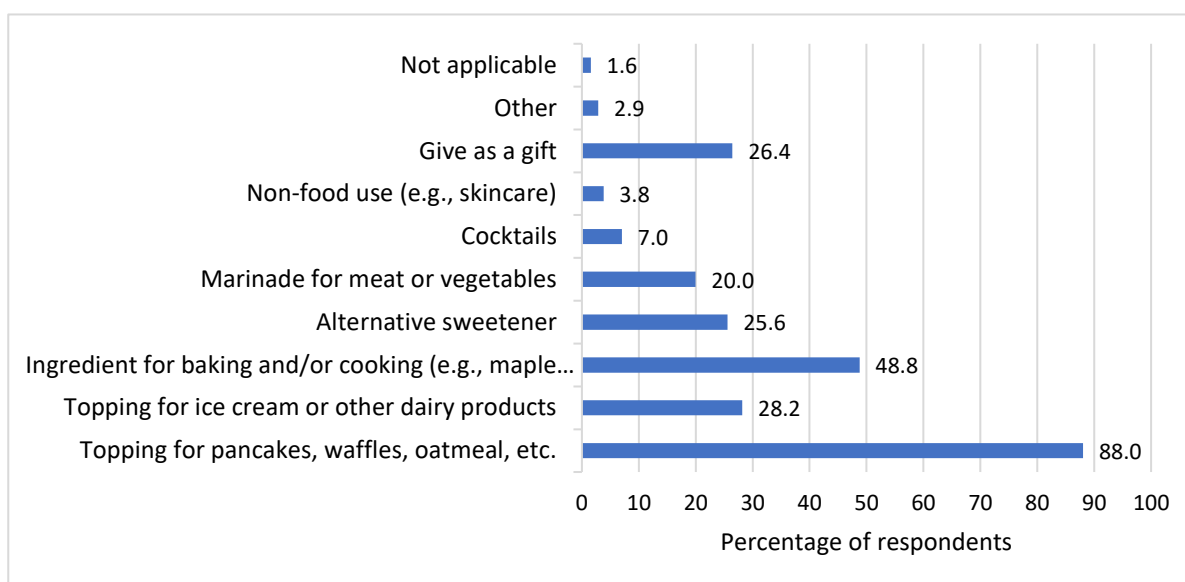


Figure 11. Maple Product Expenditure Over Past 12 Months

Consumers' Preference for Maple Syrup

Maple Syrup Use





Figure 12 shows consumers' use of maple syrup. The majority of consumers (88%) stated they use maple syrup as topping for pancakes, waffles, oatmeal, etc. About half of consumers (48.8%) indicated they use it as an ingredient for baking and cooking. Other popular uses included as topping for ice cream (28.2%), alternative sweetener (25.6%), and marinade for meat or vegetables (20%). It is also noted that about 26.4% of consumers buy maple syrup as a gift to others, indicating a potential marketing strategy to promote the product as gifts.



Maple Syrup Flavor Profiles

Table 4 shows consumer preference for the Grade A maple syrup flavor profiles (i.e., color and taste), where 1 indicates extremely dislike and 7 indicates extremely like. The results show that the amber color and rich taste maple syrup is ranked the highest, followed by the dark color and robust taste syrup, very dark color and strong taste syrup, and golden color and delicate taste syrup. It is important to note that although the "Golden color and delicate taste" and "Very dark and strong taste" profiles were rated lower than "Amber color and rich taste" and "Dark color and robust taste," more consumers indicated they were "Not Sure" about these two profiles, indicating that they may be less common in the market.

Table 4. Consumer Preferences for Grade A Maple Syrup Flavor Profiles

Maple syrup flavor profiles	Answered			Not Sure
	No. of Obs.	Mean	Std Dev	No. of Obs.
Golden Color and Delicate Taste 	1,303	4.54	1.76	93
Amber Color and Rich Taste 	1,328	5.19	1.59	68
Dark Color and Robust Taste 	1,319	5.16	1.71	77
Very Dark and Strong Taste 	1,277	4.68	1.93	119

Maple Syrup Packaging Size

Figure 13 shows consumers' preference for maple syrup packaging size. The Quart and Pint sizes are the most popular sizes.

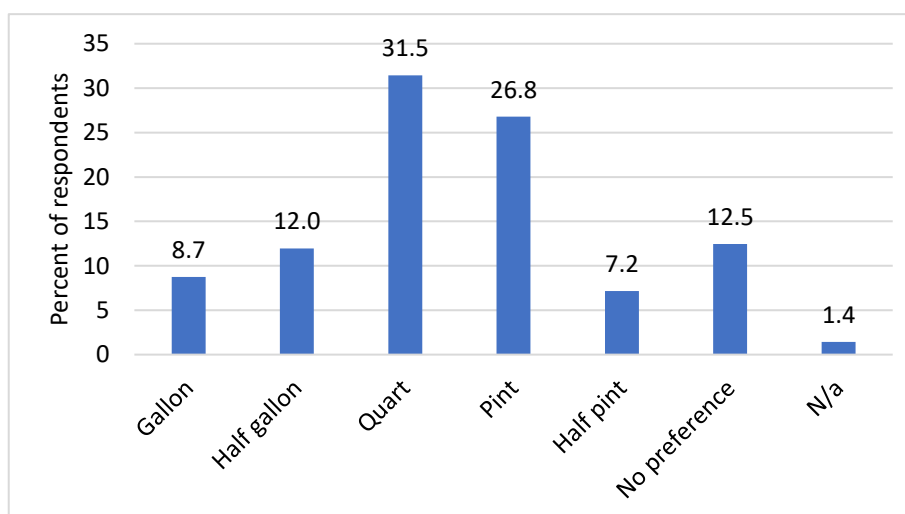


Figure 12. Consumer preferences for maple syrup packaging size

Maple Syrup Packaging Materials

Figure 14 shows consumers' preference for maple syrup packaging materials. Clear glass container is the most popular one, followed by clear plastic container and tan plastic container. There is about 14% of consumers indicate that they do not have a preference for packaging.

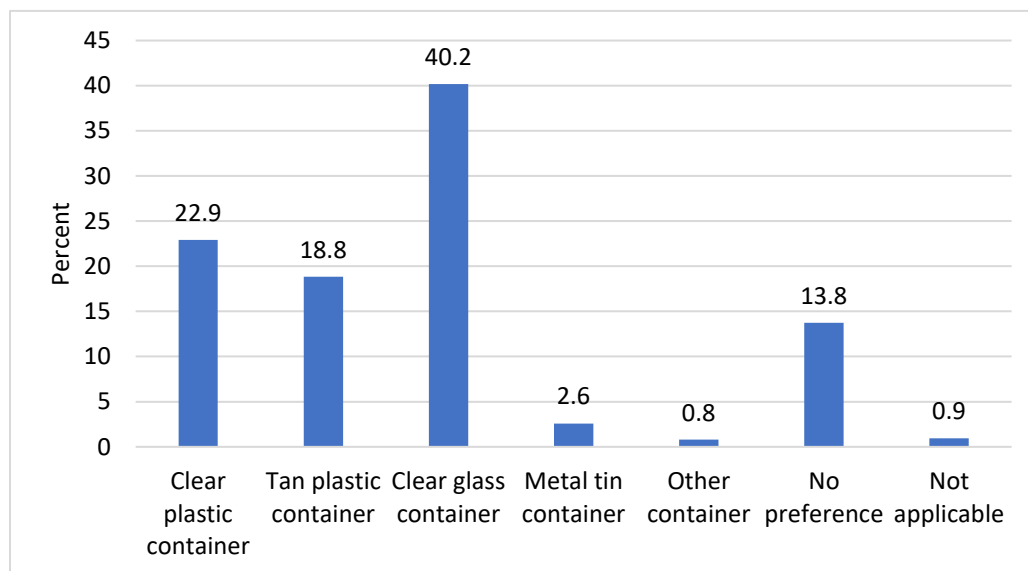


Figure 13. Consumer preferences for maple syrup packaging materials

Importance of Geographic Origin on Purchasing Decisions of Maple Products

Table 5 shows consumers' rating of maple products' quality from various origins, including country-level, region-level, and state/province-level regions. At country level, consumers considered the U.S. maple products to have higher quality (5.94 out of 7) than those produced in Canada (5.6). However, more consumers chose the "Not Applicable" answer for Canada maple products.

At the regional level, consumers rated the quality of maple products from New England (6.0) much higher than that from Midwest (4.2). A substantial number of consumers (379) chose the "Not Applicable" answer for Midwest maple products since respondents are from the Northeast area and they may not be aware of maple syrup from Midwest area or have no consumption experience. At state/province level, the average rating of the quality of maple products from Vermont is the highest, at 6.2, followed by the products from Maine (5.7), Quebec (5.34), and New York (4.9). The results indicate that maple products from New England origin, especially Vermont, signal a higher quality to consumers.

Table 5. Consumer Rating of Maple Products' Quality from Various Origins (1=Poor; 7=Excellent)					
Origins		Answered			Not Applicable
		No. of Obs.	Mean	Std Dev	No. of Obs.
Country	U.S.	1311	5.94	1.38	85
	Canada	1196	5.60	1.54	200
Region	New England	1254	5.96	1.37	142
	Midwest	1017	4.20	1.61	379
State/ Province	Quebec	1070	5.34	1.61	326
	Vermont	1264	6.20	1.30	132
	New York	1087	4.90	1.59	309
	Maine	1169	5.68	1.44	227

Figure 15 shows the level of detail consumers desire to know about the geographic origin of maple products they purchase. About half of consumers prefer to know the state/province level origin; 17.3% believe details do not matter. About 14.6%, 9.9%, and 7.6% of consumers want to know the farm, country, and city/town origins of the maple products. The results show that the state/province level origins are the most critical geographic origin information for consumers.

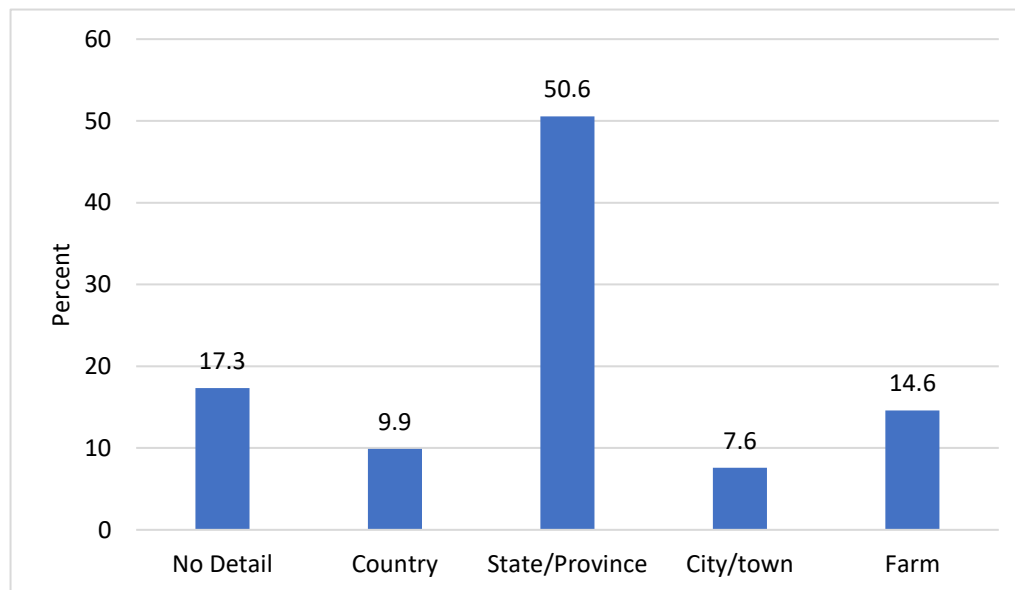


Figure 14. Level of detail consumers desire regarding geographic origin of maple syrup products

Figure 16 shows the importance of knowing the geographic origin of maple products to consumers’ purchasing decisions. The average rating is 4.86. Although a small portion of consumers (about 17%) believe the geographic origin is not very important (rating<4), most consumers believe it is an important factor in their maple product purchasing decisions.

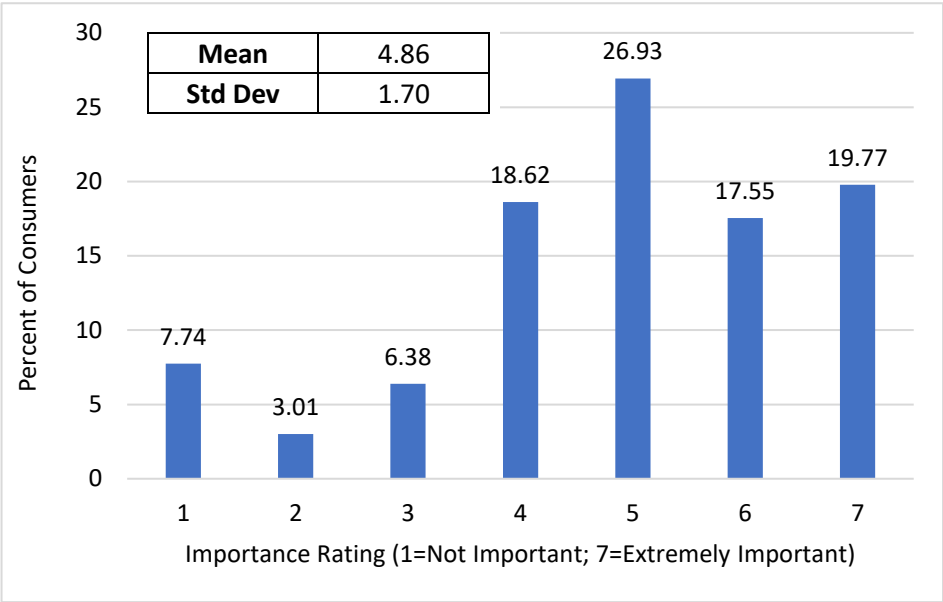


Figure 15. Importance consumers place on knowing geographic origin of maple syrup products prior to purchasing

Figure 17 displays the frequency of consumers looking for a label or store signage before purchasing maple products on a 7-point likert scale (1=Never; 7=Always). The average frequency of looking at was 4.48. The results show that consumers’ habits of searching and reading labels and signage are various at different levels. Most of the consumers search and read labels relatively frequently before purchasing maple products.

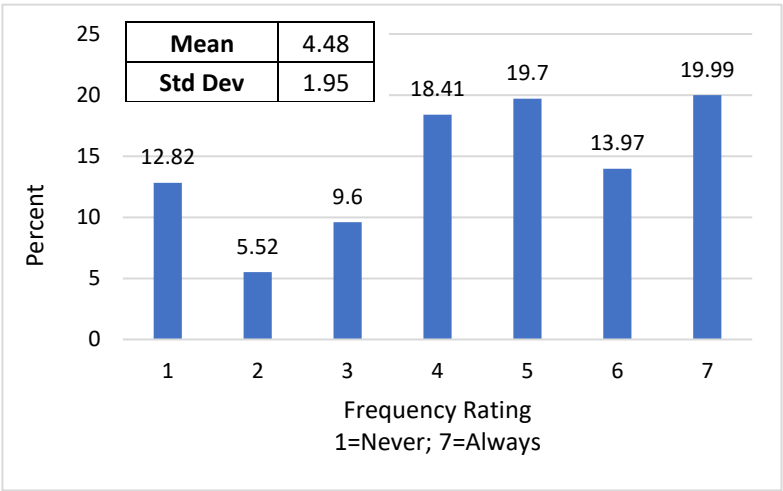


Figure 16. Frequency consumers look at labels or store signage before purchasing maple products

Consumers' Preference for Vermont Maple Products

In this section, we focus on consumer preference for Vermont maple products. We first summarize the descriptive statistics of reported expenditure on Vermont maple products and consumer willingness to pay for Vermont maple products. We then use regression models to link these variables with potential determining factors to understand the preference among various consumer segments.

Descriptive Statistics

Figure 18 shows the percentage of maple budget consumers spent on Vermont maple products over the last 12 months, based on 1,296 observations (with 100 respondents of the 1,396 that consume/purchase maple syrup omitted because they were unsure). On average, consumers spent about 46.2% of their maple budget on Vermont maple products. About 17.3% of consumers spent none of their maple budget on Vermont maple products, while 25% spent almost all their maple budget (between 90% and 100%) on Vermont maple products. The rest of consumers show various levels of spending on Vermont maple products over the last 12 months.

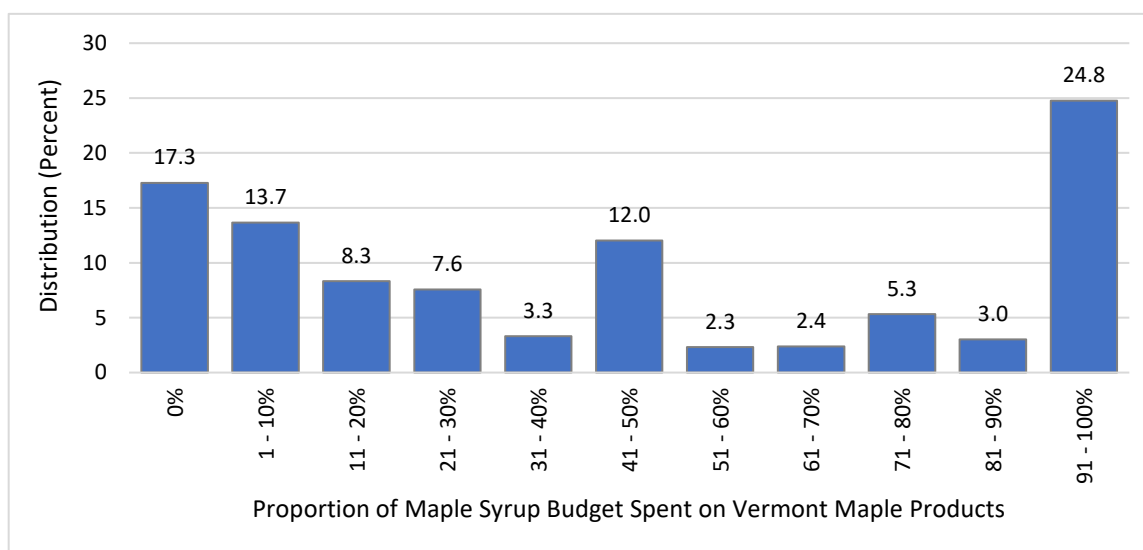


Figure 17. Distribution of Vermont maple syrup spending as percentage of total maple syrup budget

Table 6 shows consumer willingness-to-pay (WTP) premiums for specific maple products if produced by Vermont farms/producers compared to other domestic and foreign farms/producers. On average, consumers were willing to pay a 26.31% premium for Vermont maple syrup, ranking the highest among all listed maple products. Consumers also stated positive WTP premium values for the other Vermont maple products, but the magnitudes of those are much smaller than that for Vermont maple syrup.

Notably, except for the maple syrup category, a substantial number of consumers answered “Not Applicable” rather than providing a WTP premium value in the other product categories. Consumer WTP values for Vermont syrup were therefore more reliable than for other products, which consumers may be less familiar with. For example, consumers indicated relatively low WTP values for the three maple beverage products listed, but the portion of consumers who answered “Not Applicable” outnumbered the portion who provided a WTP value, indicating that these products may not yet have gained popularity among consumers.

Since most responders indicated their WTP premiums for the Vermont maple syrup, the remaining analyses focused only on the maple syrup category.

Table 6. Additional Willingness to Pay for Vermont Maple Products

Type	Answered			N/A
	No. of Obs.	Mean	Std Dev	No. of Obs.
Maple syrup	1208	26.31%	31.87%	188
Maple cream or butter (non-dairy)	750	9.96%	17.91%	646
Maple sugar	762	10.24%	18.84%	634
Maple candy products (cotton candy, taffy, etc.)	767	9.50%	16.71%	629
Baked goods (cereals, breads, doughnuts, muffins, etc.)	843	11.76%	17.68%	553
Meats	740	9.61%	16.34%	656
Dairy products (ice cream, creamer, etc.)	740	9.51%	16.40%	656
Sauces/dressings/spices (BBQ sauce, mustards, etc.)	751	8.38%	15.75%	645
Maple water	581	4.66%	12.53%	815
Maple flavored non-alcoholic beverages	579	5.95%	15.05%	817
Maple infused alcoholic beverages (beer, wine, liquor)	590	6.72%	15.75%	806

Figure 19 presents the distribution of the premiums that consumers indicated they are willing to pay for maple syrup over other domestically produced and imported maple syrup. About 14.4% of consumers stated they are willing to pay 0% premiums for Vermont maple syrup. Most consumers (about 62%) stated they are willing to pay between 1% and 30% premiums for Vermont Maple syrup. About 11.6% indicated they are willing to pay 100% or close to that amount for Vermont maple syrup. This represents the group of “loyal consumers” for Vermont maple syrup. The mean WTP for Vermont maple syrup was 26.31% including all responses, which dropped to 17.12% when removing “loyal consumers” with WTP values of 100%.

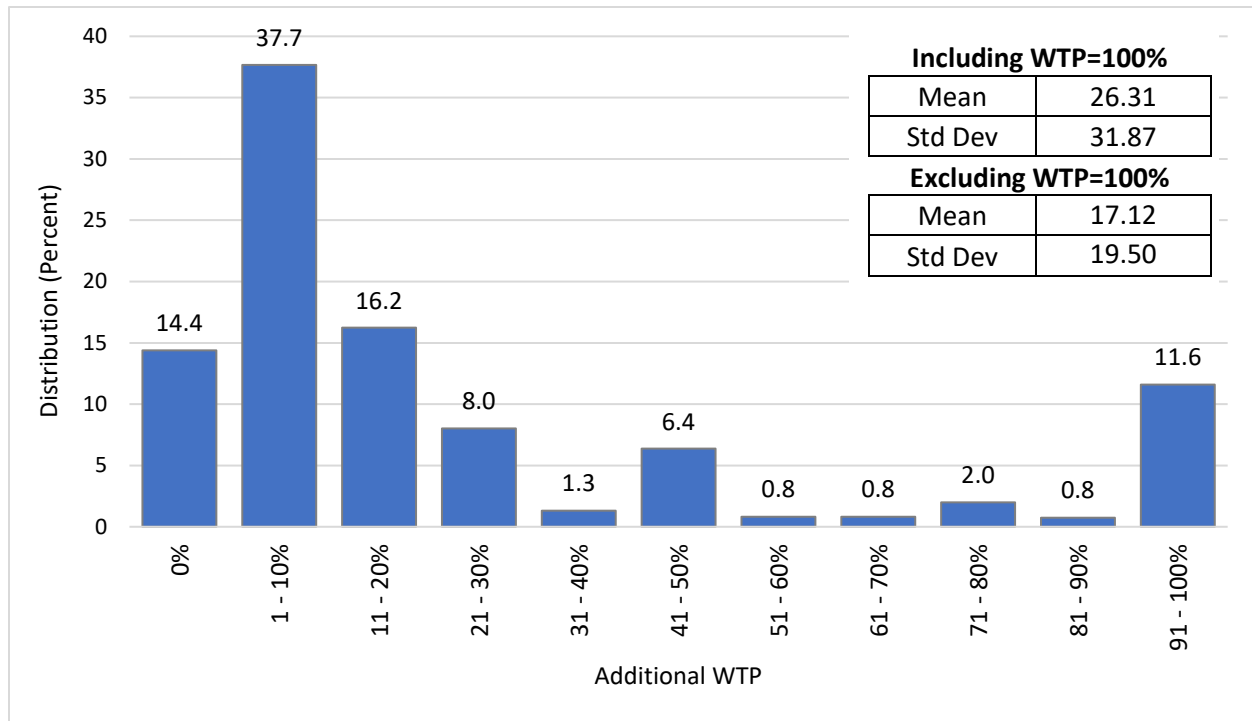


Figure 18. Distribution of additional willingness to pay for Vermont maple syrup

Regression Models

Methods

To assess potential factors affecting spending on Vermont maple products over the last 12 months and consumers' WTP premiums for Vermont maple syrup, we constructed regression models to connect the outcome variables with determining factors. Since a number of zero values are observed in both variables, we adopt the Heckman selection model and estimate it using the Heckman's two-step efficient estimator.

The Heckman selection model assumes that there exists an underlying regression relationship

$$y_i = x_j\beta + u_{1j} \quad (\text{regression equation})$$

where y_i represents the dependent variable, x_i represents the determining factors affecting the dependent variables; u_{1j} represents the error term. In this analysis, two dependent variables were assessed: 1) the percentage of maple budget allocated to Vermont-produced maple products; and 2) Additional WTP for Vermont maple syrup.

The dependent variable, y_i , is not always observed. Rather, the dependent variable for observation j is observed if

$$z_j\gamma + u_{2j} > 0 \quad (\text{selection equation})$$

where z_i represents the determining factors affecting the selection; u_{2j} represents the error term. Also, the two error terms are correlated as

$$u_1 \sim N(0, \sigma)$$

$$u_2 \sim N(0, 1)$$

$$\text{corr}(u_1, u_2) = \rho$$

Results

Table 7 presents the Heckman selection model results for the percentage spent on Vermont maple products. The summary statistics of variables used in the model are shown in Appendix Table A1. The selection model results (Step 1) show that consumers in Maine, New Hampshire, New York, Pennsylvania, and Rhode Island are less likely to spend their maple budget on Vermont maple products than the consumers in Vermont. Other factors significantly associated with increases in spending on Vermont-produced maple include: consumers who have visited Vermont; those aware of Vermont maple products; those aware of local availability of Vermont maple; those who consider geographic origin as an important factor; and those who frequently look for labels or signage before purchasing.

Characteristics associated with spending on VT maple products:

- VT residents
- Visitors of VT
- Those aware of VT maple products
- Those aware of availability of VT maple products
- Those who consider geographic origin important
- Those who look at labels or signage

The regression model results (Step 2) show that consumers in all other eight states spent less on Vermont maple products than Vermont consumers, ranging from 37.5% less among New York consumers and 20.0% less among New Hampshire consumers. Older consumers spent more on Vermont maple products, with an additional 0.35% spent on Vermont products for every one-year increase in age. Female consumers spent 3.6% less on Vermont maple products than males. Those with a bachelor's degree spent more on Vermont maple products than those with high school or GED education. Higher-income households spent more on Vermont maple products, with consumers spending an additional 10% on Vermont products for every \$10,000 increase in annual household income. Those who

have visited Vermont spent 9% more on Vermont maple products than consumers who have not. Lastly, the more importance consumers place on the geographic origin in purchasing decisions, the more they spent on Vermont maple products.

Table 7. Heckman Selection Model Results for the Percentage of Maple Budget Consumers Spent on Vermont Maple Products

Variable	Step 1: Selection		Step 2: Regression	
	Coef.	Std. Err.	Coef.	Std. Err.
<i>Connecticut</i>	-0.3202	0.2957	-28.7019***	3.9486
<i>Massachusetts</i>	-0.2392	0.3028	-29.1625***	3.8256
<i>Maine</i>	-1.0573***	0.2756	-35.4671***	4.8215
<i>New Hampshire</i>	-0.9642***	0.2732	-19.9978***	4.4124
<i>New Jersey</i>	-0.3253	0.3077	-30.7880***	4.2192
<i>New York</i>	-0.5432*	0.2995	-37.5260***	4.3339
<i>Pennsylvania</i>	-0.6732**	0.2954	-31.4713***	4.7692
<i>Rhode Island</i>	-0.6377**	0.2825	-32.1924***	4.0689
<i>Age</i>	-0.0050	0.0034	0.3581***	0.0718
<i>Female</i>	-0.1637	0.1013	-3.6280*	2.0618
<i>Other Gender</i>	6.1019	.	-3.3001	15.9770
<i>Some College</i>	-0.1298	0.1505	1.6364	3.1100
<i>Associate Degree</i>	0.1425	0.1816	1.1877	3.5048
<i>Bachelor's Degree</i>	-0.1062	0.1523	5.9847**	3.0512
<i>Graduate Degree</i>	-0.1572	0.1815	2.9812	3.6446
<i>Income</i>	0.0000	0.0000	0.0001**	0.0000
<i>Household Size</i>	0.0370	0.0443	-0.0417	0.8089
<i>Children Live in Household</i>	0.0581	0.1304	-2.1245	2.4820
<i>Visited Vermont</i>	0.2523**	0.1177	9.3454***	2.6925
<i>Unsure whether visited</i>	0.5961	0.6463	0.6469	9.8658
<i>Aware of VT Maple Products</i>	0.8085***	0.1397	-4.5330	5.5307
<i>Unsure about Awareness of VT Maple Products</i>	0.3882***	0.1458	-4.5300	4.7566
<i>Aware of VT Maple Product Availability</i>	0.6305***	0.1412	3.4568	4.6337
<i>Unsure about Availability</i>	0.2217	0.1440	-0.0657	4.1739
<i>Knowledgeable about Maple Processing</i>	0.0354	0.0344	0.0158	0.6781
<i>Importance of Geographic Origin</i>	0.0777**	0.0369	1.6250*	0.8497
<i>Frequency of looking at labels and store signage</i>	0.0523*	0.0312	0.2663	0.6836
<i>Intercept</i>	0.1087	0.3733	48.2727***	12.3165

Note: ***, **, and * indicate significant levels at 1%, 5%, and 10%.

The standard error for Other Gender variable is missing, due to lacking variation caused by few observations in that category.

Table 8 presents the Heckman selection model results for additional WTP for Vermont maple syrup over other domestically-produced and imported maple products. The summary statistics of variables used in the model are shown in Appendix Table A2. The selection model results (Step 1) show that older consumers are less likely to pay premiums for Vermont maple products than younger consumers as are those with knowledge on maple processing. Conversely, those who are aware of products being sold at their local stores are more likely to pay premiums for Vermont products, as are those who place greater importance on knowing the geographic origin of their products prior to purchasing.

The regression model results (Step 2) show that female consumers are willing to pay 6% less in premiums for Vermont maple syrup than male consumers. The remaining coefficients are not statistically significant. This indicates that different consumer segments defined by the socio-demographic and characteristics related to purchasing decisions are similar in their additional willingness to pay for Vermont maple syrup.

The modeling results show that consumers' stated WTP for Vermont maple syrup and the actual amount they spent on Vermont maple products can be inconsistent and affected by different factors. Specifically, it is implied that the decision on WTP for Vermont maple syrup is probably impulse and affected by gender-related subjective attitudes. On the contrary, consumers' actual spending on Vermont maple products are heterogeneous and determined by factors such as geolocation, age, gender, education background, income, experience of visiting Vermont, and importance placed on product origin.

Table 8. Heckman Selection Model Results for the WTP for Vermont Maple Syrup

Variable	Step 1: Selection		Step 2: Regression	
	Coef.	Std. Err.	Coef.	Std. Err.
<i>Connecticut</i>	0.1270	0.2151	-1.1691	4.3979
<i>Massachusetts</i>	0.3771	0.2395	3.2480	4.8698
<i>Maine</i>	-0.2899	0.1972	0.9391	4.9509
<i>New Hampshire</i>	-0.3283*	0.1907	3.3660	4.9508
<i>New Jersey</i>	0.1870	0.2344	4.5441	4.7014
<i>New York</i>	-0.1580	0.2267	-0.1378	4.8821
<i>Pennsylvania</i>	-0.1270	0.2283	-2.7176	5.0115
<i>Rhode Island</i>	0.1449	0.2166	0.6585	4.3438
<i>Age</i>	-0.0127***	0.0034	0.1702	0.1236
<i>Female</i>	0.1048	0.1014	-5.8910**	2.2871
<i>Other Gender</i>	-0.5461	0.7429	6.2218	19.3132
<i>Some College</i>	0.1961	0.1633	3.0492	3.5561
<i>Associate Degree</i>	0.2127	0.1832	2.8125	3.9391
<i>Bachelor's Degree</i>	-0.0214	0.1500	2.7116	3.2458
<i>Graduate Degree</i>	-0.2338	0.1698	-2.5488	4.3844
<i>Income</i>	0.0000	0.0000	0.0000	0.0000
<i>Household Size</i>	0.0270	0.0435	-0.2945	0.8753
<i>Children Live in Household</i>	-0.0127	0.1321	-2.5633	2.6318
<i>Visited Vermont</i>	-0.1024	0.1257	0.6278	2.6928
<i>Unsure whether visited</i>	-0.5472	0.4169	-5.7315	12.0985
<i>Aware of VT Maple Products</i>	0.1341	0.1564	3.2910	3.5940
<i>Unsure about Awareness of VT Maple Products</i>	-0.1062	0.1632	0.8326	3.7705
<i>Aware of VT Maple Product Availability</i>	0.3710**	0.1569	0.3742	4.5689
<i>Unsure about Availability</i>	0.1303	0.1622	0.8417	3.9533
<i>Knowledgeable about Maple Processing</i>	-0.0605*	0.0347	-0.4085	0.8840
<i>Importance of Geographic Origin</i>	0.0728**	0.0361	-0.2608	1.0090
<i>Frequency of looking at labels and store signage</i>	0.1037***	0.0303	-0.1374	1.0738
<i>Intercept</i>	0.8891***	0.3321	28.6078***	10.9933

Note: ***, **, and * indicate significant levels at 1%, 5%, and 10%.

Survey Insights

Our findings indicate that the vast majority of consumers purchase and consume maple syrup and maple products, more so than other alternatives, including honey and imitation maple table syrup. Cost, diet, and taste are common reasons consumers have not consumed maple products. Most consumers purchase maple syrup at supermarkets but many also buy directly from a producer or at local farmer's markets.

Maple syrup is perceived as the most available maple product, and the one that consumers spend the most money on at roughly \$40 per year. Consumers prefer syrups with amber color and rich taste profiles as well as dark color and robust taste. Golden color and very dark syrups score lower in preference but it appears that consumers are less sure of these profiles, indicating that they may be less available in the market. Consumers prefer quart and pint-sized packaging as well as clear glass containers.

Preference ratings for origin indicate that consumers prefer Vermont maple syrup products over other states and over imported maple products, and that most consumers prefer their products to indicate the state/province in which they were produced. Most consumers place importance on geographic origin when purchasing maple products and often look for labels and store signage to learn more about products prior to purchasing.

Consumers spend most of their maple budget on Vermont maple products and, on average, are willing to pay premiums of 26% for Vermont maple syrup over those produced in other U.S. states or imported maple syrup. Loyal consumers of the product drive the average premium, but over half of consumers are willing to pay premiums of 1-20%.

Economic modeling demonstrates a number of factors that significantly influence spending on Vermont maple syrup including state of residence, level of education, income, the experience of visiting Vermont, as well as awareness of VT maple products. However, when assessing additional willingness to pay, only gender influenced spending, with males willing to pay higher premiums than females. Willingness to pay and actual spending are inconsistent, with WTP for Vermont maple syrup likely impulsive and affected by gender-related attitudes. Overall, consumers may be willing to prioritize purchasing Vermont maple syrup over others, but they may not be as willing to pay premiums.

2. Pre-Project B2B Survey

Atlantic implemented a B2B survey of 73 Vermont maple producers to determine information on the state of industry, current/projected revenues of maple operations, and general feelings of business satisfaction and performance. This survey was conducted prior to launch of the data dashboard to collect baseline data prior to implementing a separate follow-up survey that was administered to these respondents after launching the dashboard to assess project impact.

Methodology

A prospective list of 720 Vermont maple producers was developed utilizing the databases from the Vermont Sugar Makers' Association, Vermont Maple member list, Vermont Certified Organic Producers list, as well as direct querying of general search engines. All prospective interviewees were emailed a link to a 17-question web-based questionnaire which was launched on 11/1/2020

and ended on 12/31/2020. The questionnaire spanned themes including respondent and operation characteristics; current and projected revenues; business innovation; business satisfaction/performance; and general feelings of the industry.

Respondent Characteristics

Of the 73 producers interviewed, the average size of operation included 7,181 maple taps, ranging in size from 40 to 91,000 taps. Producers have been in business an average of 27.48 years. The oldest operation has been active for 118 years and the youngest just 1 year.

In 2020, the average farm produced 3,342 gallons of maple syrup. The breakdown of their product sales is as follows: maple syrup (90.93%), candies (0.72%), cream (1.54%), butter (0.01%), other (6.79%). Respondents were also asked to comment on the percentage breakdown of maple sales in the four different maple syrup grades contributed (Figure 19). Most produced either Amber Color/Rich Flavor or Dark Color/Robust Flavor maple syrups.

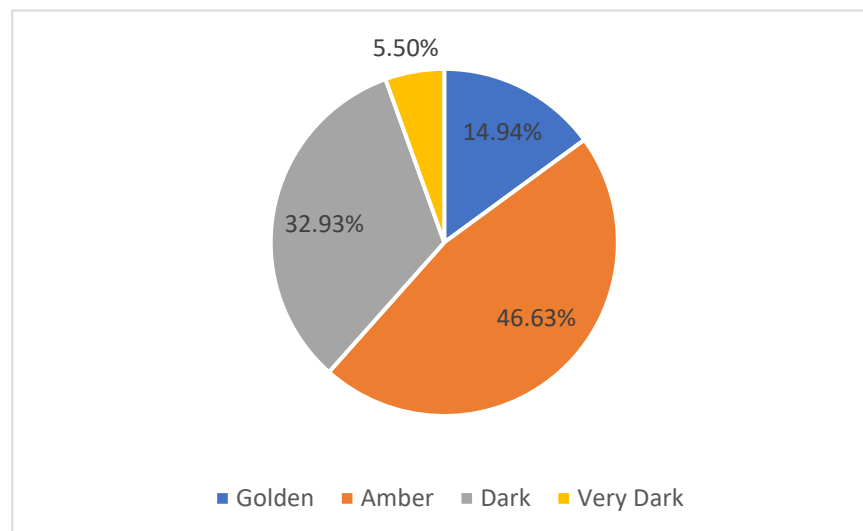


Figure 19. Breakdown by percentage of maple syrup sales by grade

In addition to the above maple products, the respondents produced a variety of other non-maple related goods to help supplement income. Some examples of these products include:

- Apples, blueberries, pumpkin, and ciders
- Christmas trees
- Milk, eggs, poultry
- Firewood
- Honey, jams, jellies, and other baked goods
- Candles, soap
- Wines, Teas

Revenues

As part of the interviews, respondents were asked to share their 2019 revenue and provide estimated revenue projects for 2020 and 2021.

- The average revenue for maple operations in 2019 was \$86,874. The top earner made \$1,320,000, which skewed the mean. The median revenue was \$27,700.
- The average projected revenue for maple operations in 2020 was \$88,712, a suggested increase of 2.12% over 2019's revenue. The largest operation projected \$1,180,000 in sales. Respondents were also asked by what percentage do they believe COVID impacted their sales. On average respondents stated an 8.15% decrease in sales due to COVID with some producers stating decreases as high as 50%.
- The average projected revenue for maple operations in 2021 is \$103,190, an increase of 16.32% over 2020's projected revenue. The largest operation projects \$1,300,000 in sales.

In addition to the raw figures, respondents were asked to share a breakdown by percentage of where their revenue streams are coming from (Figure 20).

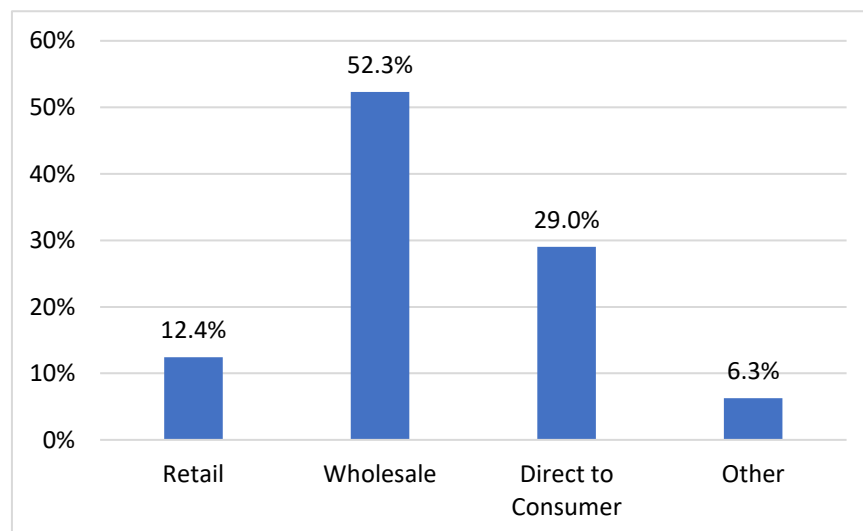


Figure 20. Breakdown by percentage of revenue streams.

Business Innovation

To remain competitive, our producers are turning to modern technology to improve yield amounts and consistency. Respondents stated using reverse osmosis, monitor systems in the woods, vacuum pumps, steam pans, and a piggyback system to improve output. To expand their offerings, producers are acquiring organic certification, creating bird-friendly maple products, and utilizing self-serve kiosks to sell products.

Business Satisfaction/Performance

As part of the interviews, respondents were also asked to comment on their current performance of their business. On a scale of 1-7, with 1 being "Extremely Dissatisfied" and 7 being "Extremely Satisfied", producers rated the current performance of their business a 5.1.

Additionally, producers were given six market factors (Covid-19; consumer demand; domestic competition; foreign competition; regional economy; and U.S. economy) and asked to rate their impact on performance of their business on a scale of 1-7, with 1 being “Extremely Negative” and 7 being “Extremely Positive.” Most respondents felt neutral to somewhat positive regarding each market factor. Consumer demand rated the most positive, with an average rating of 4.8, while Covid-19 rated lowest, with an average of 3.2 (Figure 21).

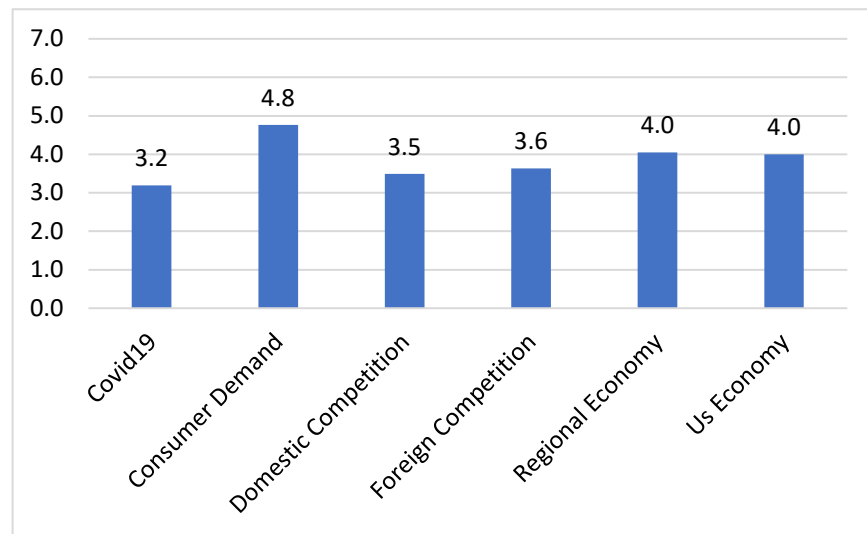


Figure 21. Perceived performance ratings related to market factors

3. Post-Project B2B Survey

Using the information from the pre-project survey, we developed a follow-up survey to determine the project impact and the value the dashboard brought to Vermont maple syrup producers and stakeholders.

Methodology

All 73 respondents from the pre-project interviews were provided with a link to the data dashboard and asked to access and explore the tool prior to participating in the follow-up interviews, which began 8/1/2021 and ended 8/30/2021. This second questionnaire spanned themes such as respondent and operation characteristics for classification purposes and perceived usefulness, value, and potential impact of the maple product dashboard. A total of 37 follow-up interviews were completed.

Respondent Characteristics

Of the 37 producers interviewed, the average operation produced 2,677 gallons of maple syrup in 2021. The largest operation produced 32,000 gallons. The breakdown of their product sales is as follows: maple syrup (93.09%), candies (1.39%), cream (1.94%), butter (0.15%), other (3.42%).

Revenues

Respondents were again asked to share their 2019 and 2020 revenue and to project their 2021 and 2022 revenue. Here are the results:

- The average revenue for maple operations in 2019 was \$105,214 with largest being \$1,320,000 and the median being \$30,000.
- The average revenue for maple operations in 2020 was \$104,128, a decrease of 1.03% from 2019's revenue. The largest operation was \$1,227,000 in sales.
- The average projected revenue for maple operations in 2021 was \$89,801, a decrease of 13.76% from 2020's revenue. The largest operation projected \$850,000 in sales.
- The average projected revenue for maple operations in 2022 is \$112,455, a projected increase of 25.23% from 2021's revenue. The largest operation projected \$1,300,000.
- As a result of utilizing the dashboard, over 40% of respondents expected to increase sales, with an average expected increase of 11.73%. Some reported expected increases as high as 50%.

Maple Dashboard Impression

Producers participating in the follow-up interviews were asked to access and explore the interactive maple product dashboard and provide feedback with regards to its usefulness and perceived value to their operation. Key findings are as follows:

- Overall impressions of the dashboard were generally favorable. On a ten-point scale with 1 being "Poor" and 10 being "Excellent", respondents rated the maple dashboard an average of 7.7.
- With regards to the value the information the dashboard could bring to planning for maple processing and production, respondents found the information somewhat valuable. On a ten-point scale with 1 being "Not at All Valuable" and 10 being "Very Valuable", respondents rated the maple dashboard a 6.46 on average.
- Respondents were somewhat likely to use the dashboard to assist with business planning and operations. On a ten-point scale with 1 being "Very Unlikely" and 10 being "Very Likely", respondents rated the maple dashboard an average of 5.92.

Respondents also rated the dashboard on five different characteristics: Ease of use; content; presentation; usefulness; accuracy. A ten-point scale was used, with 1 being "Poor" and 10 being "Excellent" (Figure 22). The tool scored highly in all characteristics, ranging from an average rating of 7.1 to 8.0. The lowest rated characteristic on average was usefulness, while the highest rated characteristic was content.

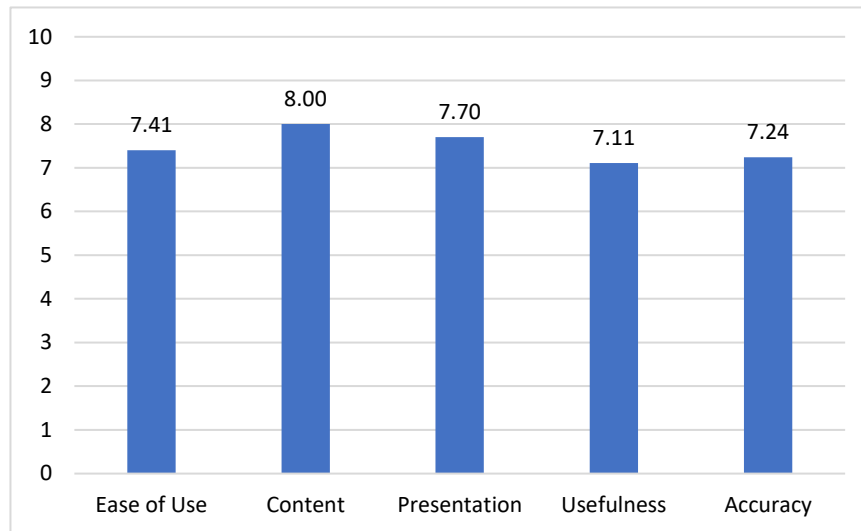


Figure 22. Maple product dashboard characteristics ratings (1-10 scale)

Respondents provided qualitative feedback on positive aspects of the dashboard. They stated the following:

- The dashboard is easy to use and understand
- There are interesting statistics with lots of good marketing data
- Fascinated with the specific information such as most popular sizes and items, perceived value of VT maple products.
- It is helpful to see consumer preferences and areas to address.
- Information regarding package size/material and maple syrup uses were helpful - either to confirm what we're doing or point to market opportunities
- The customization that is possible (e.g. filters)
- Information will be useful when considering what products to concentrate on.

They also provided suggestions as to how to potentially improve the tool, including the following:

- Gather data from other regions/include all states
- Repeat the survey and update the dashboard in a few years to observe trends in the industry
- Increase the sample size
- Add some questions regarding information desired on a producer's websites. Do they want recipes, nutritional info, production info, etc.?
- Create a mobile-friendly version of the dashboard
- Ask questions about incremental value for other attributes such as:
 - Wood fired vs. oil fired
 - Organic
 - Certified bird friendly
 - Family owned
 - Multiple generation owned
 - No pesticide/fertilizers
 - Award winning/Excellence awards
 - Certified sugarhouse

4. Outreach

Atlantic undertook extensive outreach efforts to communicate survey results, market analysis and findings, and the availability of the tools through a variety of channels:

- News releases highlighting findings to online, print, TV, and radio outlets;
- Coordination for distribution of the data dashboards all producers through the Vermont Maple Sugar Makers Association (VMSMA) and University of Vermont Extension;
- PowerPoint and poster presentations of findings made available for Vermont agricultural and local food conferences and other meetings as needed;
- Data dashboard posted on Atlantic and available for VAAFM and VMSMA websites.

This findings report will also be disseminated to Vermont maple syrup and maple product producers and other stakeholders in the same manner.

The outreach timeline and number of stakeholders reached is presented below.

Outreach Timeline

#	Date	Outreach	Total Reach
1	4/23/2021	Upload dashboard to Atlantic website	95
2	4/28/2021	Upload dashboard to VAAFM website and distribute press release for VAAFM newsletter	6,000
3	5/15/2021	Send out findings and dashboard via e-newsletter to VMSMA membership and blog post on VMSMA website	887
4	5/27/2021	Data dashboard presentation to VAAFM & public	20
5	7/9/2021	Article posted in Maple News	12,000
6	8/3/2021	Prepare press release for UVM Extension	Unknown
7	8/3/2021	Prepare press release for Maple Digest	5,000
8	9/30/2021	Prepare press release for Vermont news outlets	Unknown
9	10/18/2021	Virtual Presentation at International Maple Conference hosted by NAMSC	300

Results for each outreach effort in the table above are presented as follows:

#1 Atlantic uploaded the Maple Data Dashboard to their website on 4/23/2021 receiving 95 page views as of 7/29/2021. The webpage is available at <https://www.atlanticcorporation.com/vt-maple-dashboard>.

#2 The Maple Data Dashboard was uploaded to the official VAAFM website on 4/28/2021, available at <https://agriculture.vermont.gov/maple-data-dashboard>. VAAFM also prepared a press release on the SCBG maple project included in their 5/15/2021 newsletter email to an estimated 6,000 VAAFM subscribers.

#3 VMSMA sent out two emails to its 887 subscribers to share the Maple Data Dashboard, Maple Report, and the 5/27/2021 presentation hosted by VAAFM. Each of these emails had

approximately 396 unique opens. VMSMA membership consists of Vermont maple producers, processors, and stakeholders.

#4 Atlantic team members, Ray Bernier and Matt George, presented key findings and the Maple Data Dashboard at a webinar hosted by VAAFM on 5/27/2021. Webinar viewers included approximately 20 VAAFM staff, VMSMA members and maple producers.

#5 Atlantic sent out a press release to Maple News posted on July 7, 2021. Estimated views of these posted articles totals 12,000. The article can be found at: <https://www.themaplenews.com/story/consumers-want-to-know-what-state-their-syrup-is-coming-from-especially-from-vermont/376/>

#6 Atlantic sent a press release to UVM Extension on 8/3/2021. UVM Extension subscribers comprise of academic and industry professionals.

#7 Atlantic sent out a press release to Maple Digest on 8/3/2021. There are 5,000 estimated maple producing subscribers to the Maple Digest.

#8 Atlantic sent a press release to the following Vermont news outlets on 9/30/2021: Addison County Independent, Barre-Montpelier Times Argus, Bennington Banner, Brattleboro Free Press, Caledonian-Record, Deerfield Valley News, Herald of Randolph, Manchester Journal, News & Citizen, The Rutland Herald, St. Albans Messenger, The Stowe Reporter, Vermont Magazine, Stratton Magazine, and Vermont Business Magazine.

#9 Atlantic was invited to present at the International Maple Conference hosted by the North American Maple Syrup Council in Niagara Falls, New York on 10/18/2021. The estimated attendance is 300 maple producers, academics, and stakeholders. In-person conference cancelled due to increase in COVID-19 cases, but they are working to provide a virtual option to share research findings.

5. Data Dashboard

Atlantic created an interactive data dashboard that Vermont maple syrup industry stakeholders can use to explore the data from the consumer preference survey. The dashboard is a web-based application hosted on both the VAAFM and Atlantic websites. It is available using following link: <https://agriculture.vermont.gov/maple-data-dashboard>.

The dashboard is easy to navigate and provides clear instructions as well as background information about the survey data. Users can query granular information such as “How much more are females in Massachusetts ages 35-44 years willing to pay for Vermont maple syrup?” using dropdown filters (Figure 23).

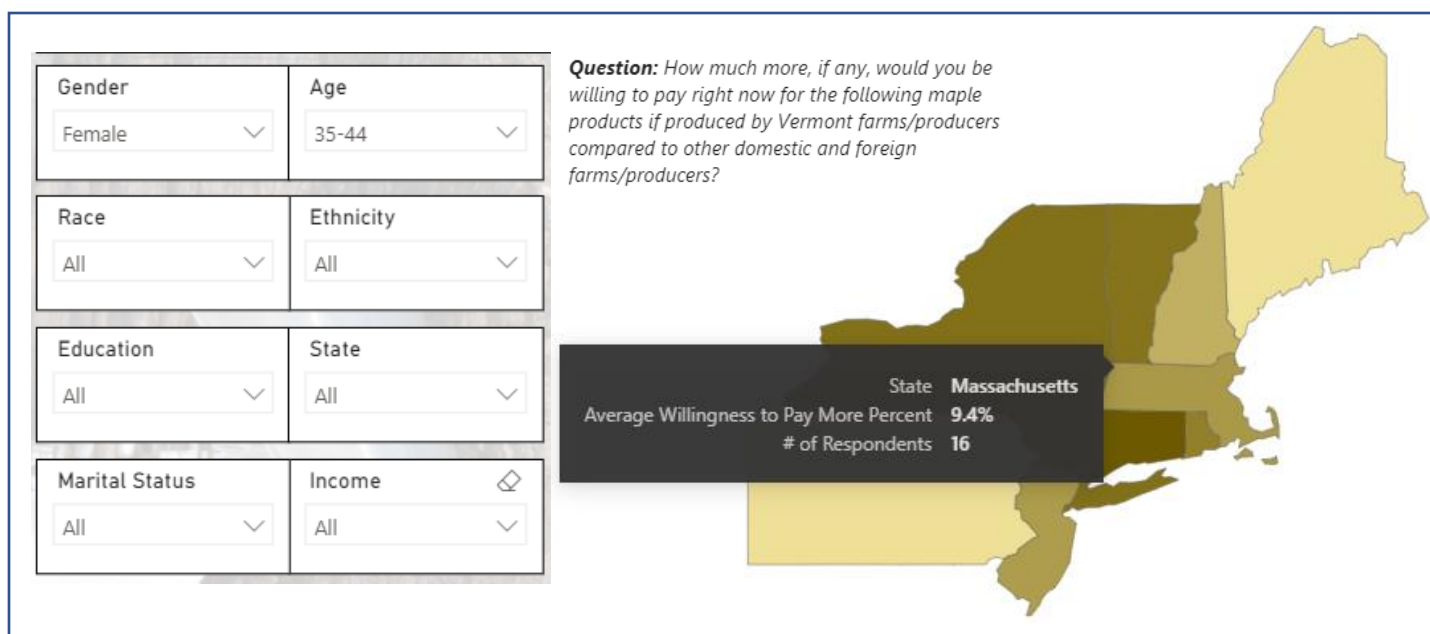


Figure 23. Example figure from the Maple Data Dashboard showing how much more females from Massachusetts ages 35-44 are willing to pay for Vermont maple syrup compared to other domestic/foreign producers

The dashboard allows users to select the maple product of interest: baked goods, dairy products, flavored non-alcoholic beverages, infused alcoholic beverages, maple candy products, maple cream or butter, maple sugar, maple syrup, maple water, meats, sauces/dressings/spices. A user guide is provided instructing users how to select filters, reset filters, and to click on graphics to explore more granular detail. Users can click on a section of a graph to select a subgroup of respondents, and the data will then be filtered to that subgroup, changing all remaining graphs on the page automatically.

6. Project Conclusion

Atlantic conducted a consumer insights survey on preferences and attitudes for Vermont maple syrup to support market expansion and enable producers and stakeholders to identify and evaluate key market opportunities for their products. The primary purpose of this project was to provide Vermont's maple syrup producers with critical consumer data that will support them in moving from supply-driven to market-driven business strategies, models, and planning. Typically, farms oversaturate the market with supply instead of calculating size and proximity to valuable markets before commencing production or considering value-added options and business scenarios. Our data will facilitate stakeholders in identifying target markets for their products by providing granular preference data for specific value-added maple syrup products that can be assessed by consumer demographics of interest and can enable stakeholders to tailor product offerings and production volumes to meet local consumer demand. We believe this work will identify regional demand for and increase the value of Vermont maple syrup.

Key findings from the consumer survey indicate that the vast majority (80%) of Northeast consumers have consumed and purchased maple syrup within the past 12 months, and that

consumption rates for maple syrup are greater than that of alternatives such as honey, agave high-fructose corn syrup, natural fruit syrups, and imitation maple-flavored table syrup.

Not surprisingly, Vermont residents were most aware of Vermont maple syrup operations and brands. Residents of neighboring states of Massachusetts and New Hampshire also had high rates of awareness of Vermont maple syrup, while those in Pennsylvania had low rates. Respondents had generally favorable views of the impact of the maple industry on various economic and societal factors, especially with regards to local economies, rural farming communities, and the overall U.S. economy. Respondents buy most of their maple syrup products at supermarkets but also purchase a meaningful amount directly from producers and at farmer's markets/farm stands, demonstrating a preference for locally produced maple products.

Aside from maple syrup, most popular maple products include baked goods, meats, dairy products (ice cream, creamer, etc.), and condiments such as sauces, dressings, or spices, but the vast majority of consumers' maple budget is spent on syrup. Surprisingly, there was no overwhelmingly preferred maple flavor profile. All scored relatively high when assessing liking, with amber color/rich taste and dark color/robust taste scoring the highest; however, some consumers were unsure about their liking of each flavor profile, indicating a lack of awareness.

In terms of packaging, consumers prefer quart- and pint-sizes as well as clear glass bottles. Clear and tan plastic containers are also acceptable to consumers, while metal tin containers are not. Northeast consumers have slightly higher preference for U.S.-produced syrup compared to Canada, prefer New England over Midwest maple syrup, and Vermont syrup over that produced in New York, Maine, or Quebec. For those who care about geographic origin, state-level is most preferred over country and city/town of origin, though a considerable number of consumers preferred farm-level detail.

Consumers are willing to pay (WTP) over 25% more for Vermont maple syrup compared to other domestic or foreign produced maple syrups. WTP was highest for syrup over other value-added products. Regression models indicate several factors associated with actual spending on Vermont maple syrup, including being a VT resident, having visited VT, awareness of Vermont maple syrup, and placing high importance on geographic origin of products.

To assess the impact of our research, Atlantic conducted pre- and post-project interviews of Vermont maple syrup and maple product producers. Producers ranged in size from 40 to 91,000 taps. Most produced either Amber Color/Rich Flavor or Dark Color/Robust Taste syrups. Wholesale and direct to consumer are the leading sales channels. About half of the 73 respondents to the pre-project survey completed the follow-up survey after exploring the data dashboard. These respondents had generally favorable impressions of the dashboard overall and found the content particularly useful. A little over 40% of respondents indicated that they think the dashboard could help them improve revenue by an average of 11.7%.

Atlantic is still conducting outreach efforts, post-project, and we will present at the International Maple Syrup Institute's Annual Conference in October 2021.

The data dashboard is hosted by both the VAAFM and Atlantic websites and is available at <https://agriculture.vermont.gov/maple-data-dashboard>.